

R E M A R K S

Reconsideration of the above-identified patent application is respectfully requested in view of the following remarks. Claims 1 through 20 remain in the application.

The invention comprises a method for removing a small layer of copper from copper features forming part of a printed circuit board by using etchants, many of which have been used before, but not without removing large quantities of copper. The copper is selectively removed in the present invention by applying an inorganic acid echant, persulfate and phosphate salts.

Claims 1, 2, 5, 6, 8, 9, 13, and 14 - 20 of the invention have been respectively rejected under 35 U.S.C. §§102(b) and 103(a) as being anticipated or unpatentable by JP 5-148,658. This rejection is respectfully traversed for the following reasons:

a) At first blush, the JP5-148658 reference (hereinafter referred to as the JP reference) appears similar to the claimed invention. On closer scrutiny, however, it will

become obvious that the JP reference actually teaches away from the invention. The JP reference teaches use of nitric acid in combination with sulphuric acid for treating the copper surfaces. The nitric acid is eschewed by the process of Applicants' invention, specifically because it creates toxic byproducts, such as nitric and/or nitrous oxides. Therefore, the process described by the cited JP reference, although looking very similar to the present invention, is a teaching away from the invention.

b) It should be understood that many of the substances described in the present invention are well known in treating electronic surfaces, so it comes as no surprise that the JP reference should appear to give the same teaching. Please note that the JP reference is ten years old. The JP reference, in fact, does not teach the invention, because its process removes too much copper. The purpose of the invention, as recited in the claims, is not to etch bulk copper from the electronic surfaces. Note the term "microetch" in claims 17 and 19. Also note the wording eschewing the "bulk etching" of copper in claims 1 and 20. The process of the JP reference, however, takes away too much

copper, and therefore is an opposite teaching.

c) TSUBAI et al also teaches away from the invention by suggesting the use of nitric acid in combination with the phosphate salts. TSUBAI et al is an old teaching. Please note the 1980 issue date. Applicants reiterate that many of the same substances would naturally be known in the art of treating electronic surfaces. Small differences, however, such as the lack of nitric acid, do make for big, unexpected results.

For all of the above listed reasons, the combination that suggests the use of the primary JP reference is respectfully not tenable. Furthermore, it would not make sense, nor would there be motivation to use the further teachings of TSUBAI et al with FERRIER et al, since without limiting the copper removal, these teachings would not produce the intended result. In other words, the standard of obviousness required by the statute would not be met.

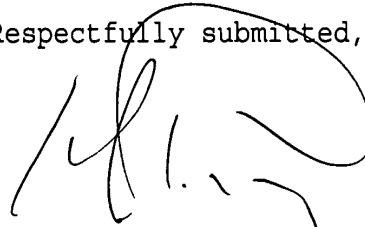
In view of the foregoing remarks, Applicants respectfully request that claims 1 through 20 be allowed and that the

application be passed to issue.

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1 4. The process as recited in claim 3, wherein the
2 cation in said phosphate salt is selected from the group
3 consisting of cations of: ammonium, potassium, sodium,
4 lithium, and water soluble alkaline metal cations.

1 5. The process as recited in claim 1, wherein said
2 inorganic acid is selected from the group consisting of
3 sulfuric acid, phosphoric acid, metaphosphoric acid and
4 pyrophosphoric acid.

1 6. The process as recited in claim 1, wherein the
2 cation in said persulfate salt is selected from the group
3 consisting of alkali metals, ammonium and water soluble
4 alkaline metal cations.

1 7. The process as recited in claim 1, wherein said
2 aqueous solution comprises approximately 25-100 gm/liter
3 sodium persulfate, up to about 3 volume% phosphoric acid,
4 and up to about 0.116 Molar sodium phosphate.

5 8. The process as recited in claim 1, wherein said
6 aqueous solution further comprises a surfactant.